

CLAIMS

What is claimed is:

1. A method of forming a seal in an annular space between a pipe extending axially through a cylindrical hole, where said pipe is positioned eccentrically in said hole, comprising the steps:

selecting a plurality of resilient compressible elastomer seal blocks to form a ring of blocks surrounding said pipe in said hole, each block having a fixed height, a selected thickness and a selected width;

inserting a smallest thickness block in a portion of the annular space between the pipe and the opening comprising a smallest radial dimension, with the thickness direction of the block arranged radially, the height direction arranged axially, and the width direction arranged circumferentially;

inserting, in a similar orientation, a largest thickness block in a greatest radial dimension between the pipe and the opening;

inserting in similar orientations, intermediate blocks having thicknesses which will allow those blocks to fit in the intermediate radial space, between the smallest thickness block and the largest thickness block, the angular width of the selected plurality of blocks, when joined together in a ring, comprising approximately 360 degrees;

inserting a bolt through the height of each block parallel to the axis of the pipe; and

thereafter, tightening the bolts so as to compress the blocks in the axial direction, causing the blocks to expand in the radial and circumferential directions such that the blocks will completely fill the annular space between the pipe and the hole to effect a seal therebetween.

2. The method according to claim 1, including the step of connecting adjacent blocks together prior to inserting any of said blocks into said annular space.

3. The method according to claim 2, wherein a first and last block are connected together to form a ring of blocks, after said blocks have been inserted into said annular space.

4. The method according to claim 1, wherein some intermediate adjacent blocks have identical thicknesses.

5. The method according to claim 1, wherein some intermediate adjacent blocks have identical widths.

6. The method according to claim 1, wherein the width of the blocks may vary from block to block.

7. A seal unit for forming a seal in an annular space between a pipe extending axially through a cylindrical hole, where said pipe is positioned eccentrically in said hole, comprising:
a plurality of resilient compressible elastomer seal blocks arranged in a ring of blocks surrounding said pipe in said hole, each block having a fixed height, a selected thickness and a selected width;

a smallest thickness block having a thickness, with the thickness direction of the block arranged radially, selected to fit in a portion of the annular space between the pipe and the hole comprising a smallest radial dimension, a largest thickness block having a thickness, oriented similarly, selected to fit in a portion of the annular space comprising a greatest radial dimension, and intermediate blocks having thicknesses, oriented similarly, which will allow those blocks to fit in an intermediate radial distance, between the smallest thickness block and the largest thickness block, the angular width of the selected plurality of blocks, all arranged with the width dimension arranged circumferentially, when joined together in a ring, selected to comprise approximately 360 degrees; and

a bolt extending through the height of each block parallel to the axis of the pipe;

wherein tightening of the bolts will compress the blocks in the axial direction, causing the blocks to expand in the radial and circumferential directions, such that the blocks will completely fill the annular space between the pipe and the hole to effect a seal therebetween.

8. The seal unit according to claim 7, wherein adjacent blocks are interconnected to one another.

9. The seal unit according to claim 7, wherein some intermediate adjacent blocks have identical thicknesses.

10. The seal unit according to claim 7, wherein some intermediate adjacent blocks have identical widths.

11. The seal unit according to claim 7, wherein the width of the blocks may vary from block to block.

12. A seal unit for forming a seal between a pipe extending axially through a cylindrical hole, where said pipe is positioned eccentrically in said hole, comprising:

a plurality of resilient compressible elastomer seal blocks, each block having a fixed height, a thickness and a width;

said blocks being connectible to each other to form a ring, with a thickness of each block being arranged in a radial direction relative to said ring, a thickness of said blocks varying from block to block, with a smallest thickness block being arranged diametrically across from a largest thickness block in said ring, with intermediate blocks between said smallest thickness block and said largest thickness block having progressively increasing thicknesses leading from said smallest thickness block to said largest thickness block in each circumferential direction.

13. A seal unit according to claim 12, wherein some adjacent blocks have identical thicknesses.

14. A seal unit according to claim 12, wherein some adjacent blocks have identical widths.

15. A seal unit according to claim 12, wherein the width of the blocks may vary from block to block.

16. The seal unit according to claim 12, wherein a bolt is provided in each block, extending through the height of each block, such that when said bolts are tightened, the blocks will compress in the height direction, but expand in the radial and circumferential directions.

17. A seal member for use in forming a seal between a pipe extending axially through a cylindrical hole, comprising:

a resilient compressible elastomer seal block, said block having a height to be oriented in an axial direction relative to said pipe, a width to be oriented in a circumferential direction relative to said pipe and a thickness to be oriented in a radial direction relative to said pipe,

said block having an arcuate shape in said circumferential direction and having a varying thickness in the circumferential direction such that a thickness at one circumferential end of the block is less than a thickness at an opposite circumferential end of the block.

18. A seal member according to claim 17, wherein said block has a passage extending therethrough in said axial direction.

19. A seal member according to claim 17, wherein said block has an overhanging portion at one end and a projecting portion at an opposite end, with a passage extending axially through the overhanging portion and the projecting portion, such that when two block are positioned adjacent to one another, the overhanging portion of one block will overlie the projecting portion of the other block and the passages will align.

20. A method of forming a seal in an annular space between a pipe extending axially through a cylindrical hole, where said pipe is positioned eccentrically in said hole, comprising the steps:

providing a variety of preformed resilient compressible elastomer seal blocks, each block having a fixed height, a selected thickness and a selected width, with some blocks having a smallest thickness, some blocks having a greatest thickness and remaining blocks having an intermediate thickness;

measuring an outer diameter of said pipe;
measuring an inner diameter of said hole;
measuring at least one of a smallest distance or a greatest distance between said pipe and said hole,

based upon said three measurements, selecting a plurality said seal blocks to form a ring of blocks surrounding said pipe in said hole, with each block having a thickness slightly less than the distance between the pipe and the hole in a particular arcuate region of the annular space to be occupied by said block;

inserting a smallest thickness block of the selected blocks in the arcuate region of the annular space between the pipe and the opening comprising a smallest radial dimension, with the thickness direction of the block arranged radially, the height direction arranged axially, and the width direction arranged circumferentially;

inserting, in a similar orientation, a largest thickness block of the selected blocks in a greatest radial dimension between the pipe and the opening;

inserting in similar orientations, intermediate blocks having thicknesses which will allow those blocks to fit in the intermediate radial space, between the smallest thickness block and the largest thickness block, the angular width of the selected plurality of blocks, when joined together in a ring, comprising approximately 360 degrees;

inserting a bolt through the height of each block parallel to the axis of the pipe; and

thereafter, tightening the bolts so as to compress the blocks in the axial direction, causing the blocks to expand in the radial and circumferential directions such that the blocks will completely fill the annular space between the pipe and the hole to effect a seal therebetween.